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Docket: 20/200

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

Date: January 3, 2003

In re Application of:

Jacques Yves Guigne

Serial No.: 09/698,927

Filed: October 26, 2000

For: SEABED SONAR MATRIX SYSTEM

Group Art Unit: 3662

Examiner: Ian J. Lobo

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APPEAL FROM THE PRIMARY EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES

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Enclosed is an Appeal Brief (3 copies) with Appendix (3 copies). The enclosed check covers the $160.00 fee for the Appeal Brief for a large entity.

2. Enclosed check for $160.00.

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Leon D. Rosen
Reg. No. 21,077

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

In re Application of:

Jacques Yves Guigne

Serial No.: 09/698,927 — Group Art Unit: 3662

Filed: October 26, 2000 — Examiner: Ian J. Lobo

For: SEABED SONAR MATRIX SYSTEM

BRIEF FOR APPELLANT
UNDER 35 CFR 1.192(c)

Hon. Commissioner of Patents — January 3, 2003

Washington D.C. 20231 — Los Angeles, CA 90024

This is an appeal from the Examiner in Group Art Unit 3662 rejecting claims 1-5 and 8.

REAL PARTY IN INTEREST

The real party in interest is Guigne International LTD, the assignee of record in the application.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Pending:	Claims 1-5, 8 and 14.
Cancelled:	Claims 6-7 and 9-13.
Appealed:	Claims 1-5 and 8.

STATUS OF AMENDMENTS

An amendment after Final Action was filed and entered.

SUMMARY OF THE INVENTION

The present invention relates to apparatus for sensing characteristics of a seafloor and regions (up to perhaps one or two meters) below the seafloor. As shown in Fig. 1, the apparatus includes an array (14) or row of acoustic, or sonic transducers, and at least one sonic detector, that lie close to the seafloor (12). Circuitry connected to the transducers energizes them only one at a time. They are each energized to create a narrow sonic beam (40 in Fig. 8) that may have a width of only a few centimeters. The transducers are arranged in at least one row and are energized with a carrier frequency (32 in Fig. 4) of at least 200 kHz, modulated by a lower frequency, to generate the narrow sonic beam. The water transforms (p. 7, l.11-13) the modulated pulses into a narrow beam having the frequency of the modulation. Fig 15 is an example of an actual image generated by the apparatus, and showing the density at a particular depth of a seafloor; the image indicates a sea urchin at 98 which is resting on the seafloor, with the higher amplitudes indicating higher density locations of the sea urchin.

Successive transducers along the row are energized at periods spaced apart by perhaps 1.5 milliseconds (B in Fig. 4), so after a small fraction of a second an entire row of transducers has scanned the seafloor. The echos from each narrow beam interrogate a rod-shaped volume of the seafloor.

Fig. 1 shows that applicant uses a vehicle (16) to tow a row of transducers (14) along a path that lies an average of no more than six meters above the seafloor, and with the transducers facing downward.

As shown in Fig. 2, applicant provides at least three sonic detectors (D1, D2, etc.) that are interspersed with the transducers. This minimizes the time required for a nearby detector to pick up an echo so that the next transducer can be energized to generate the next sonic beam at another nearby location.

ISSUES

All claims 1-5 and 8 were rejected as shown or as obvious over certain references or combinations. Accordingly, the only issue is whether the claims are anticipated by or obvious over the references.

GROUPING OF CLAIMS

The rejected claims do not stand or fall together. Each claim is discussed in the argument section of this Appeal Brief.

ARGUMENT

1. The Prior Art

Neal, et al. (3,840,875).

Wilk (5,930,199).

Guigne (4,924,449).

Raudsep (3,673,555).

Thompson (U.S. Invention Registration H1490)

Claims 1 and 3 were rejected as obvious over Neal or Wilk in view of Guigne and Raudsep.

Claims 2, 4 and 5 were rejected as obvious over Neal or Wilk in view of Guigne, in further view of Thompson.

Claim 8 was rejected as anticipated by Neal and by Wilk.

2. Discussion of Appealed Claims

Claim 1 was rejected as obvious over Neal or Wilk in view of Guigne and Raudsep. Claim 1 describes apparatus for sensing characteristics of a seafloor, which includes at least one row of transducers that each can generate a sonic beam, and at least one sonic detector. Circuitry for energizing the transducers one at a time, energizes a transducer with a pulse of the type shown in Fig. 4 (at 30), with a carrier frequency of at least 200 kHz modulated by a frequency less

than the carrier frequency. As described in the specification, the water transforms the pulse into a narrow sonic beam that penetrates a rod-shaped area in the seafloor. Echos at multiple depths along the narrow penetrated volume of the seafloor, are detected by the detector.

The specification describes (page 7, lines 2-4) the fact that a carrier frequency of at least 0.2 MHz (which is 200 kHz) is desirable for producing a beam with a small spread angle of much less than 5°.

Neal (3,840,875) describes a system that energizes each of a group of sonic transducers in sequence, with pulses rather than a carrier frequency, and without modulated by any lower frequency. Modulation by a lower frequency enables the detection of gross characteristics of the seabed. He does not suggest a carrier frequency of at least 200 kHz. In addition, Neal uses the same detectors that generate sonic pulses, to detect the echos of those pulses (his col. 4, lines 64-68), rather than using at least one separate sound detector.

Wilk (5,930,199) describes transducers 28 that create sonic pulses and separate sensors 30 that detect echos. He does not suggest that the output of a transducer be at least 200 kHz or suggest that a high carrier frequency be modulated by a lower frequency, to create a narrow sonic beam in water.

Guigne suggests a carrier frequency that is modulated, but he suggests a carrier frequency of about 100 kHz or lower (his col. 7, lines 43-49) which would not provide as narrow a sonic beam in water.

Raudsep (3,673,555) describes a system where a beacon (10 in Fig. 1) on the seafloor transmits signals to help an oil drilling ship position itself. He transmits a carrier wave of 40 kHz modulated by a signal of 0.72 kHz. His system is not relevant to probing the seafloor to determine it characteristics.

The only reference that shows a carrier wave modulated by a lower frequency, the modulation producing lower frequencies for detecting gross characteristics of the seafloor, is Guigne. However, Guigne suggests a carrier frequency of about 100 kHz or lower, rather than at least 200 kHz and higher.

<u>Guigne</u>'s relatively low carrier frequency will result in a beam with a much wider spread angle, which is useful to detect a wide area of the seabed, but which is not as useful when applicant uses his array of multiple transducers energized in sequence to interrogate multiple narrow rod-like volumes of the seafloor so as to obtain a very detailed scan of the seafloor. Accordingly, applicant believes that claim 1 is not obvious in view any combination of the four references, and therefore that claim 1 should be allowed.

Claim 2, which depends from claim 1, was rejected as obvious over <u>Neal</u> or <u>Wilk</u>, in view of <u>Guigne</u> and <u>Thompson</u>. Claim 2 describes the apparatus as including a vehicle constructed to tow the transducers along a path no more than six meters above the seafloor, and with the transducers facing downward, all as shown in Fig. 1. As described in the specification (page 8, lines 11-12) at 200 kHz a height of about six meters is necessary to convert the pulse to a narrow beam of lower frequency for good resolution of the seabed, but a low height is desirable to confine the interrogation to a narrow rod-like volume of the seafloor. The only reference suggesting a preferable height of a sonic system above the seafloor is <u>Thompson</u>. However, <u>Thompson</u> generates seismic waves, which are pressure waves but which have frequencies orders of magnitude less than acoustic waves generated by applicant. <u>Thompson</u> detects echos by <u>electromagnetic</u> field sensors, as compared to a sonic detector. <u>Thompson</u> relates to a different technology, of seismic research which detects formations deep under the seafloor, compared to applicant's sonic detectors which are orders of magnitude higher in frequency and which detect conditions at and close to the seafloor. Therefore, <u>Thompson</u> describes technology involving electromagnetic detector for detecting seismic shocks that he produces, rather than a system that includes a sonic detector for detecting echos of high frequency sonic energy in the seabed.

Claim 3, which depends from claim 1, was rejected over <u>Neal</u> or <u>Wilk</u> in view of <u>Guigne</u> and <u>Raudsep</u>. Claim 3 describes the apparatus of claim 1, with at

least three detectors for detecting echos, the three detectors being interspersed with the transducers that generate sonic beams. Neal uses the same transducers to transmit sonic energy as to detect it. As discussed in the application, applicant's separate detectors provide much higher sensitivity than a device used to both generate sonic pulses and detect echos of them. Wilk describes transducers that create sonic energy and separate detectors, but does not described the detectors interspersed with transducers and does not describe applicant's frequencies that result in narrow beams. If the detectors are not interspersed with transducers, it will take longer for the echos to reach the detectors and echos from locations other than a narrow post-like volume will reach a detector during the time period when it is suppose to detect only echos from the narrow volume. Guigne describes an array of transducers that produce sonic energy and a receiver array, but does not describe them interspersed or describe applicant's higher carrier frequency which results in a narrower sonic beam. Raudsep does not intersperse his detectors with his transducers that generate sonic energy, since his transducer is the sea bottom and his detectors are on a ship.

The combination of the references do not anticipate claim 3, because the references together do not suggest detectors separate from the transducers that generate pulses, but with the detectors interspersed with the transducers.

Claim 4 was rejected as obvious over Neal or Wilk in view of Guigne and Thompson. Claim 4 describes an array of sonic transducers and at least one sonic detector, and a vehicle that supports the array at not more than six meters above the seafloor, with the transducers energized one at a time to produce pulsed sonic beams. The Examiner cited Thompson, which describes towing a cable with a seismic source that generates strong waves that penetrate deep into the seafloor to detect oil deposits, the cable supporting an electromagnetic detector for detecting electromagnetic fields generated by the seismic waves.

Thompson says the distance of his cable above the seafloor can vary to about one hundred feet above the seafloor, but is preferably between one and twenty feet above the sea bottom. Thompson's system is very different from applicant's, in that Thompson is not concerned about forming a high frequency wave into a narrow beam that penetrates a small distance below the seafloor, and with sonic echos detected by a sonic detector. Since none of the other references suggest applicant's height of no more than six meters above the seafloor or the advantages thereof of producing a beam with a very small spread angle that penetrates a narrow rod-like volume of the seafloor, applicant believes that claim 4 is not anticipated.

Claim 5, which depends from claim 4 and which was rejected on the same references, describes a sonic detector adjacent to each sonic transducer of a row. Thompson's Fig. 1 shows that his electric field sensors 34 do not lie adjacent to his seismic wave-generating electrodes 26.

Claim 8 was rejected as anticipated by Neal and as anticipated by Wilk. Claim 8 described apparatus for sensing characteristics of regions at and under a seafloor, which includes an array of transducers that generate sonic beams and an array of sonic detectors. Circuitry is connected to the transducers to energize them one at a time to generate a narrow sonic beam. The sonic detectors include at least three detectors interspersed with the transducers, each transducer associated with an adjacent sonic detector. Applicant's Fig. 2 shows such an arrangement where the detectors D1, D2, etc. are each associated with a transducer T1, T2, etc. This arrangement results in each detector being far more sensitive to the sonic echos produced by its corresponding transducer than echos produced by other transducers that are much further away.

Neal uses the same transducers to detect as to produce a sonic beam, because he does not use separate sonic detectors. His col. 4, lines 64-68 states "During this time each receives five energizing pulses . . . which cause the

radiation of radiant energy and then it is connected to a receive state to absorb and detect any reflection from these five energizations." Since Neal does not show separate sonic detectors, each associated with an adjacent sonic transducer that produces a pulse, and does not describe the high sensitivity obtained from such separate sonic detectors, applicant believes that claim 8 is not anticipated by Neal.

Wilk uses transducers for creating sonic energy and uses separate detectors, but the transducers and detectors are not interspersed. He places the transducers and detector in the same generally vicinity and keeps track of their relative locations, but he does not describe trying to keep a detector adjacent to a particular transducer.

Accordingly, believes that claim 8 also is not anticipated by the references.

It is respectfully urged that for these reasons a reversal of the Examiner is in order. An oral hearing is not requested.

Respectfully submitted,

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APPENDIX TO BRIEF
CLAIMS 1-5 and 8

Hon. Commissioner of Patents
Washington D.C. 20231

January 3, 2003
Los Angeles, CA 90024

1. Apparatus for sensing characteristics of regions at and under a seafloor, comprising:

an array comprising a plurality of transducers that each can generate a sonic beam, and at least one sonic detector that can detect sound;

circuitry connected to said plurality of transducers to energize them one at a time with an electrical pulse to generate a narrow sonic beam, said circuitry connected to said at least one detector to receive signals representing a sonic echo of each sonic beam;

said plurality of transducers being arranged in at least one row and each of said pulses has a carrier frequency of at least 200 kHz and modulated by a frequency less than said carrier frequency to generate a narrow sonic beam.

2. The apparatus described in claim 1 including:

a vehicle that is constructed to tow said row of transducers along a path that lies an average of no more than six meters above the seafloor, with said transducers facing downward at the seafloor and with said row extending in a direction that is primarily perpendicular to said path.

3. The apparatus described in claim 1 wherein:

said at least one sonic detector include at least three detectors which are interspersed with said transducers.

4. A system for sensing regions at and under a seafloor, comprising:

an array that includes a row of sonic transducers and at least one sonic detector;

a vehicle that supports said row at a height above the seafloor of no more than six meters and that can move said row along a path above said seafloor;

circuitry connected to said transducers to energize them one at a time to produce pulsed sonic beams.

5. The system described in claim 4 wherein:

said at least one sonic detector includes a row of sonic detectors extending parallel to said row of sonic transducers, with each sonic detector lying adjacent to a selected sonic transducer.

8. Apparatus for sensing characteristics of regions at and under a seafloor, comprising:

an array comprising a plurality of transducers that each can generate a sonic beam, and a plurality of sonic detectors that can detect sound;

circuitry connected to said plurality of transducers to energize them one at a time with an electrical pulse to generate a narrow sonic beam, said circuitry

connected to said detectors to receive signals representing a sonic echo of each sonic beam;

said plurality of transducers being arranged in at least one row;

said sonic detectors include at least three detectors and said detectors are interspersed with said transducers, with each transducer associated with an adjacent sonic detector.

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